

WHAT IS CLAIMED IS:

1. A guidance information providing apparatus comprising:

5 a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of the passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and destination;

15 a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

20 a viewpoint setting unit which sets a plurality of viewpoint position candidates for visualizing the guiding route in the target area expressed in the three-dimensional shape data;

an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the three-dimensional shape data;

25 an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from the plurality

of viewpoint position candidates on the basis of the evaluation value of visibility and by projecting the three-dimensional shape data from the determined viewpoint position; and

5           a presentation unit configured to present the generated information map to a user.

2. A guidance information providing apparatus comprising:

10           a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

15           a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

          an input unit which inputs a departure place and destination;

20           a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

25           a viewpoint setting unit which sets a viewpoint position for visualizing the guiding route in the target area expressed in the three-dimensional shape data;

          a deformation unit which deforms the three-dimensional shape data to improve visibility, from the

selected viewpoint position, of the guiding route in the target area expressed in the three-dimensional shape data;

an information map generating unit which generates  
5 the information map by projecting the deformed three-dimensional shape data; and

a presentation unit configured to present a user with the information map generated by the information map generating unit.

10 3. A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point  
15 data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and  
20 destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

25 a viewpoint setting unit which sets a viewpoint position for the guiding route expressed in the three-dimensional shape data;

a deformation unit which performs a plurality of deformation processes for deforming the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

an evaluation unit which obtains an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data;

an information map generating unit which generates the information map by determining route deformation for generating the information map from said plurality of route deformation candidates on the basis of the evaluation value of visibility of each of the route deformation candidates and by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and

a presentation unit configured to present the generated information map.

4. A guidance information providing apparatus comprising:

a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

5 an input unit which inputs a departure place and destination;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

10 a viewpoint setting unit which sets a plurality of viewpoint positions candidates for visualizing the guiding route expressed in the three-dimensional shape data;

15 a deformation unit which deforms the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the three-dimensional shape data;

20 an evaluation unit which obtains an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route in the target area expressed in the deformed three-dimensional shape data;

25 an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the

evaluation values of visibility and by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

5 a presentation unit configured to present a user with the information map generated by the information map generating unit.

5. A guidance information providing apparatus comprising:

10 a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

15 a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

an input unit which inputs a departure place and destination;

20 a guiding route search unit which searches the first memory to acquire a guiding route connecting the input departure place and destination, on the basis of the network data;

25 a viewpoint setting unit which sets a plurality of viewpoint positions candidates for expressing and visualizing the guiding route in the three-dimensional shape data;

a deformation unit which performs a deformation process for deforming the three-dimensional shape data

to improve visibility, from each of the viewpoint  
position candidates, of the guiding route expressed in  
the three-dimensional shape data, to obtain a plurality  
of route deformation candidates for each viewpoint  
5 position candidate;

an evaluation unit which obtains an evaluation  
value of visibility, from each of the viewpoint  
position candidate, of each of the route deformation  
candidates expressed in the three-dimensional shape  
10 data;

an information map generating unit which generates  
the information map by determining a viewpoint position  
for generating the information map from said plurality  
of viewpoint position candidates and route deformation  
15 for generating the information map from said plurality  
of route deformation candidates on the basis of the  
obtained evaluation values of visibility, and by  
projecting, from the determined viewpoint position, the  
three-dimensional shape data subjected to the route  
20 deformation; and

a presentation unit configured to present a user  
with the information map generated by the information  
map generating unit.

6. An apparatus according to claim 5, wherein the  
25 deformation unit performs, as the deformation process,  
at least a process of extracting and deleting a portion  
which obstructs the guiding route from the

three-dimensional shape data stored in the second memory.

7. An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process,  
5 at least a process of extracting and deleting a portion representing a floor which does not include any of the departure place, destination, and guiding route from the three-dimensional data.

8. An apparatus according to claim 5, wherein the  
10 deformation unit performs, as the deformation process, at least a process of extracting and deleting a portion representing a region which does not include any of the departure place, destination, and guiding route from the three-dimensional data.

9. An apparatus according to claim 5, wherein the  
15 deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route from the three-dimensional data, and moving the portion by a  
20 predetermined distance in a predetermined direction.

10. An apparatus according to claim 5, wherein the  
25 deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route, and a portion representing an obstructed floor, from the three-dimensional data, and rotating the portions by a predetermined angle around a predetermined axis.



11. An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a portion representing a floor which obstructs the guiding route from the three-dimensional data, and curving the portion in a predetermined form.

12. An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a floor including a portion positioned far from a viewpoint from the three-dimensional data, and rotating the floor by a predetermined angle around a predetermined axis.

13. An apparatus according to claim 5, wherein the deformation unit performs, as the deformation process, at least a process of extracting a floor including a portion positioned far from a viewpoint from the three-dimensional data, and curving the floor in a predetermined form.

14. An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of a size of the information map.

15. An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of an evaluation value of visibility, from the viewpoint position, of the guiding route expressed in the three-dimensional data.

16. An apparatus according to claim 5, wherein the deformation unit selects a type of deformation process to be performed on the basis of an instruction from a user.

5        17. An apparatus according to claim 5, wherein if a guiding route included in a generated information map has a partial route having the visibility evaluation value which does not satisfy a predetermined reference value, the information map generating unit adds, to the  
10        information map, information indicating a supplementary explanation related to the partial route.

18. An apparatus according to claim 5, wherein if a guiding route included in a generated information map has a partial route having the visibility which does  
15        not satisfy a predetermined reference value, the information map generating unit splits the information map from the partial route.

19. An apparatus according to claim 5, wherein the evaluation unit obtains an evaluation value of  
20        visibility of a route surface of a route of the guiding route, except for a route connecting floors, on the basis of a size of a visible projected area.

20. An apparatus according to claim 19, wherein the evaluation unit obtains an evaluation value of  
25        visibility of a virtual route surface, which is formed perpendicularly to a route connecting floors, of the guiding route, on the basis of a size of a visible

projected area.

21. An apparatus according to claim 5, wherein polygon mesh data is used as the three-dimensional shape data.

5        22. A guidance information providing method to provide guidance information, comprising:

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data  
10        representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

searching for a guiding route connecting the input  
15        departure place and destination, on the basis of the network data;

setting a plurality of viewpoint position candidates for visualizing the guiding route expressed in the three-dimensional shape data;

20        obtaining an evaluation value of visibility, from each viewpoint position candidate, of the guiding route in the target area expressed in the three-dimensional shape data;

determining a viewpoint position for generating  
25        the information map from the plurality of viewpoint position candidates, on the basis of the evaluation value of visibility from each viewpoint position

candidate;

generating the information map by projecting the three-dimensional shape data from the determined viewpoint position; and

5           presenting the generated information map to a user.

23. A guidance information providing method comprising,

10           preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

15           inputting a departure place and destination;

searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

20           setting a viewpoint position for visualizing the guiding route expressed in the three-dimensional shape data;

deforming the three-dimensional shape data so as to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data;

25

generating the information map by projecting the deformed three-dimensional shape data; and

presenting a user with the information map  
generated by the information map generating unit.

24. A guidance information providing method  
comprising,

5           preparing network data including line segment data  
representing a passage in a target area of route  
guidance in an information map and point data  
representing a connecting point of a passage, and  
three-dimensional shape data representing a  
10          three-dimensional shape of the target area;

          inputting a departure place and destination;

          searching for a guiding route connecting the input  
departure place and destination, on the basis of the  
network data;

15          setting a viewpoint position for the guiding route  
expressed in the three-dimensional shape data;

          performing a plurality of deformation processes  
for the three-dimensional shape data to improve  
visibility, from the selected viewpoint position, of  
20          the guiding route expressed in the three-dimensional  
shape data, to obtain a plurality of route deformation  
candidates;

          obtaining an evaluation value of visibility,  
from the selected viewpoint position, of each of  
25          the route deformation candidates expressed in the  
three-dimensional shape data;

          determining route deformation for generating the

information map from said plurality of route deformation candidates, on the basis of the evaluation value of visibility of each of the route deformation candidates;

5           generating the information map by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route deformation; and

          presenting the generated information map.

10           25. A guidance information providing method comprising,

          preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data  
15           representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

          inputting a departure place and destination;

          searching for a guiding route connecting the input  
20           departure place and destination, on the basis of the network data;

          setting a plurality of viewpoint positions for visualizing the guiding route expressed in the three-dimensional shape data;

25           deforming the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the

three-dimensional shape data;

obtaining an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route expressed in the deformed three-

5 dimensional shape data;

determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, on the basis of the evaluation values of visibility;

10 generating the information map by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

presenting a user with the information map generated by the information map generating unit.

15 26. A guidance information providing method comprising,

preparing network data including line segment data representing a passage in a target area of route guidance in an information map and point data  
20 representing a connecting point of a passage, and three-dimensional shape data representing a three-dimensional shape of the target area;

inputting a departure place and destination;

25 searching for a guiding route connecting the input departure place and destination, on the basis of the network data;

setting a plurality of viewpoint positions for

expressing and visualizing the guiding route in the three-dimensional shape data;

performing a deformation process for the three-dimensional shape data to improve visibility,  
5 from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

obtaining an evaluation value of visibility, from  
10 each viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

determining a viewpoint position for generating the information map from said plurality of viewpoint  
15 position candidates, and route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the obtained evaluation values of visibility;

generating the information map by projecting, from  
20 the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

presenting a user with the information map generated by the information map generating unit.

25 27. A computer program product storing a program for allowing a computer to function as a guidance information providing apparatus, the computer program



product including:

means for storing network data including line  
segment data representing a passage in a target area of  
route guidance in an information map and point data  
5 representing a connecting point of a passage;

means for strong three-dimensional shape data  
representing a three-dimensional shape of the target  
area;

means for inputting a departure place and  
10 destination;

means for searching for a guiding route connecting  
the input departure place and destination, on the basis  
of the network data;

means for setting a plurality of viewpoint  
15 position candidates for visualizing the guiding route  
expressed in the three-dimensional shape data;

means for obtaining an evaluation value of  
visibility, from each viewpoint position candidate, of  
the guiding route expressed in the three-dimensional  
20 shape data;

means for determining a viewpoint position for  
generating the information map from said plurality of  
viewpoint position candidates, on the basis of the  
evaluation value of visibility from each viewpoint  
25 position candidate;

means for generating the information map by  
projecting the three-dimensional shape data from the

determined viewpoint position; and

means for presenting the generated information map to a user.

28. A computer program product storing a program  
5 for allowing a computer to function as a guidance  
information providing apparatus, the computer program  
product including:

means for storing network data including line  
segment data representing a passage in a target area of  
10 route guidance in an information map and point data  
representing a connecting point of a passage;

means for storing three-dimensional shape data  
representing a three-dimensional shape of the target  
area;

15 inputting a departure place and destination;

searching for a guiding route connecting the input  
departure place and destination, on the basis of the  
network data;

20 setting a viewpoint position for visualizing the  
guiding route expressed in the three-dimensional shape  
data;

deforming the three-dimensional shape data to  
improve visibility, from the selected viewpoint  
position, of the guiding route expressed in the  
25 three-dimensional shape data;

generating the information map by projecting the  
deformed three-dimensional shape data; and

a presenting function which presents a user with the information map generated by the information map generating unit.

29. A computer program product storing a program  
5 for allowing a computer to function as a guidance information providing apparatus, the computer program product including:

means for storing network data including line  
segment data representing a passage in a target area of  
10 route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

15 means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

20 means for setting a viewpoint position for the guiding route expressed in the three-dimensional shape data;

means for performing a plurality of deformation processes for the three-dimensional shape data to  
25 improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of

route deformation candidates;

means for obtaining an evaluation value of  
visibility, from the selected viewpoint position, of  
each of the route deformation candidates expressed in  
5 the three-dimensional shape data;

means for determining route deformation for  
generating the information map from said plurality of  
route deformation candidates, on the basis of the  
evaluation value of visibility of each of the route  
10 deformation candidates;

means for generating the information map by  
projecting, from the selected viewpoint position, the  
three-dimensional shape data subjected to the  
determined route deformation; and

15 a presenting function which presents the generated  
information map.

30. A computer program product storing a program  
for allowing a computer to function as a guidance  
information providing apparatus, the computer program  
20 product:

means for storing network data including line  
segment data representing a passage in a target area of  
route guidance in an information map and point data  
representing a connecting point of a passage;

25 means for storing three-dimensional shape data  
representing a three-dimensional shape of the target  
area;

means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

means for selecting a plurality of viewpoint positions for visualizing the guiding route expressed in the three-dimensional shape data;

means for deforming the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data;

means for obtaining an evaluation value of visibility, from each of the viewpoint position candidates, of the guiding route expressed in the deformed three-dimensional shape data;

means for determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation values of visibility;

means for generating the information map by projecting the deformed three-dimensional shape data from the determined viewpoint position; and

means for presenting a user with the information map generated by the information map generating unit.

31. A computer program product storing a program for allowing a computer to function as a guidance

information providing apparatus, the computer program product including:

5 means for storing network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

means for storing three-dimensional shape data representing a three-dimensional shape of the target area;

10 means for inputting a departure place and destination;

means for searching for a guiding route connecting the input departure place and destination on the basis of the network data;

15 means for selecting a plurality of viewpoint positions for expressing and visualizing the guiding route in the three-dimensional shape data;

20 means for performing a deformation process for the three-dimensional shape data so as to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

25 means for obtaining an evaluation value of visibility, from each viewpoint position candidate, of each of the route deformation candidates expressed in

the three-dimensional shape data;

means for determining a viewpoint position for  
generating the information map from the plurality of  
viewpoint position candidates, and route deformation  
5 for generating the information map from said plurality  
of route deformation candidates, on the basis of the  
obtained evaluation values of visibility;

means for generating the information map by  
projecting, from the determined viewpoint position, the  
10 three-dimensional shape data subjected to the route  
deformation; and

means for presenting a user with the information  
map generated by the information map generating unit.

32. A server apparatus adapted to communicate with  
15 a client apparatus, comprising:

a first memory which stores network data including  
line segment data representing a passage in a target  
area of route guidance in an information map and point  
data representing a connecting point of a passage;

20 a second memory which stores three-dimensional  
shape data representing a three-dimensional shape of  
the target area;

a receiving unit which receives a departure place  
and destination from the client apparatus as a request  
25 source;

a guiding route search unit which searches the  
first memory to acquire a guiding route connecting the

received departure place and destination, on the basis of the network data;

5 a viewpoint setting unit which sets a plurality of viewpoint position candidates to visualize the guiding route in the target area expressed in the three-dimensional shape data;

10 an evaluation unit which obtains an evaluation value of visibility, from each viewpoint position candidate, of the guiding route expressed in the three-dimensional shape data;

15 an information map generating unit which generates the information map by determines a viewpoint position for generating the information map from said plurality of viewpoint position candidates on the basis of the evaluation value of visibility from each viewpoint position candidate, and by projecting the three-dimensional shape data from the determined viewpoint position; and

20 a transmitting unit which transmits the generated information map to the client apparatus.

33. A server apparatus adapted to communicate with a client apparatus, comprising:

25 a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional



shape data representing a three-dimensional shape of the target area;

5 a receiving unit which receives a departure place and destination from the client apparatus as a request source;

a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination on the basis of the network data;

10 a viewpoint setting unit which sets a viewpoint position to visualize the guiding route in the target area expressed in the three-dimensional shape data;

a deformation unit which deforms the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data;

15 an information map generating unit which generates the information map by projecting the deformed three-dimensional shape data; and

20 a transmitting unit which transmits the generated information map to the client apparatus.

34. A server apparatus adapted to communicate with a client apparatus, comprising:

25 a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

5 a receiving unit which receives a departure place and destination from the client apparatus as a request source;

10 a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination, on the basis of the network data;

a viewpoint setting unit which sets a viewpoint position for the guiding route expressed in the three-dimensional shape data;

15 a deformation unit which performs a plurality of deformation processes for the three-dimensional shape data to improve visibility, from the selected viewpoint position, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates;

20 an evaluation unit which obtains an evaluation value of visibility, from the selected viewpoint position, of each of the route deformation candidates expressed in the three-dimensional shape data;

25 an information map generating unit which generates the information map by determining route deformation for generating the information map from said plurality of route deformation candidates on the basis of the

evaluation value of visibility of each of the route deformation candidates, and by projecting, from the selected viewpoint position, the three-dimensional shape data subjected to the determined route

5 deformation; and

a transmitting unit which transmits the generated information map to the client apparatus.

35. A server apparatus adapted to communicate with a client apparatus, comprising:

10 a first memory which stores network data including line segment data representing a passage in a target area of route guidance in an information map and point data representing a connecting point of a passage;

15 a second memory which stores three-dimensional shape data representing a three-dimensional shape of the target area;

a receiving unit which receives a departure place and destination from a client apparatus as a request source;

20 a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination, on the basis of the network data;

25 a viewpoint setting unit which sets a plurality of viewpoint positions to visualize the guiding route expressed in the three-dimensional shape data;

a deformation unit which deforms the

three-dimensional shape data to improve visibility,  
from each of the viewpoint position candidates, of the  
guiding route expressed in the three-dimensional shape  
data;

5           an evaluation unit which obtains an evaluation  
value of visibility, from each of the viewpoint  
position candidates, of the guiding route expressed in  
the deformed three-dimensional shape data;

          an information map generating unit which generates  
10   the information map by determining a viewpoint position  
for generating the information map from said plurality  
of viewpoint position candidates on the basis of the  
evaluation values of visibility, and by projecting the  
deformed three-dimensional shape data from the  
15   determined viewpoint position; and

          a transmitting unit which transmits the generated  
information map to the client apparatus.

36. A server apparatus adapted to communicate with  
a client apparatus, comprising:

20           a first memory which stores network data including  
line segment data representing a passage in a target  
area of route guidance in an information map and point  
data representing a connecting point of a passage;

          a second memory which stores three-dimensional  
25   shape data representing a three-dimensional shape of  
the target area;

          a receiving unit which receives a departure place

and destination from a client apparatus as a request source;

5 a guiding route search unit which searches the first memory to acquire a guiding route connecting the received departure place and destination on the basis of the network data;

a viewpoint setting unit which sets a plurality of viewpoint positions for expressing and visualizing the guiding route in the three-dimensional shape data;

10 a deformation unit which performs a deformation process for the three-dimensional shape data to improve visibility, from each of the viewpoint position candidates, of the guiding route expressed in the three-dimensional shape data, to obtain a plurality of route deformation candidates for each viewpoint position candidate;

15 an evaluation unit which obtains an evaluation value of visibility, from each viewpoint position candidate, of each of the route deformation candidates expressed in the three-dimensional shape data;

20 an information map generating unit which generates the information map by determining a viewpoint position for generating the information map from said plurality of viewpoint position candidates, and route deformation for generating the information map from said plurality of route deformation candidates, on the basis of the obtained evaluation values of visibility, and by

projecting, from the determined viewpoint position, the three-dimensional shape data subjected to the route deformation; and

5           a transmitting unit which transmits the generated information map to the client apparatus.